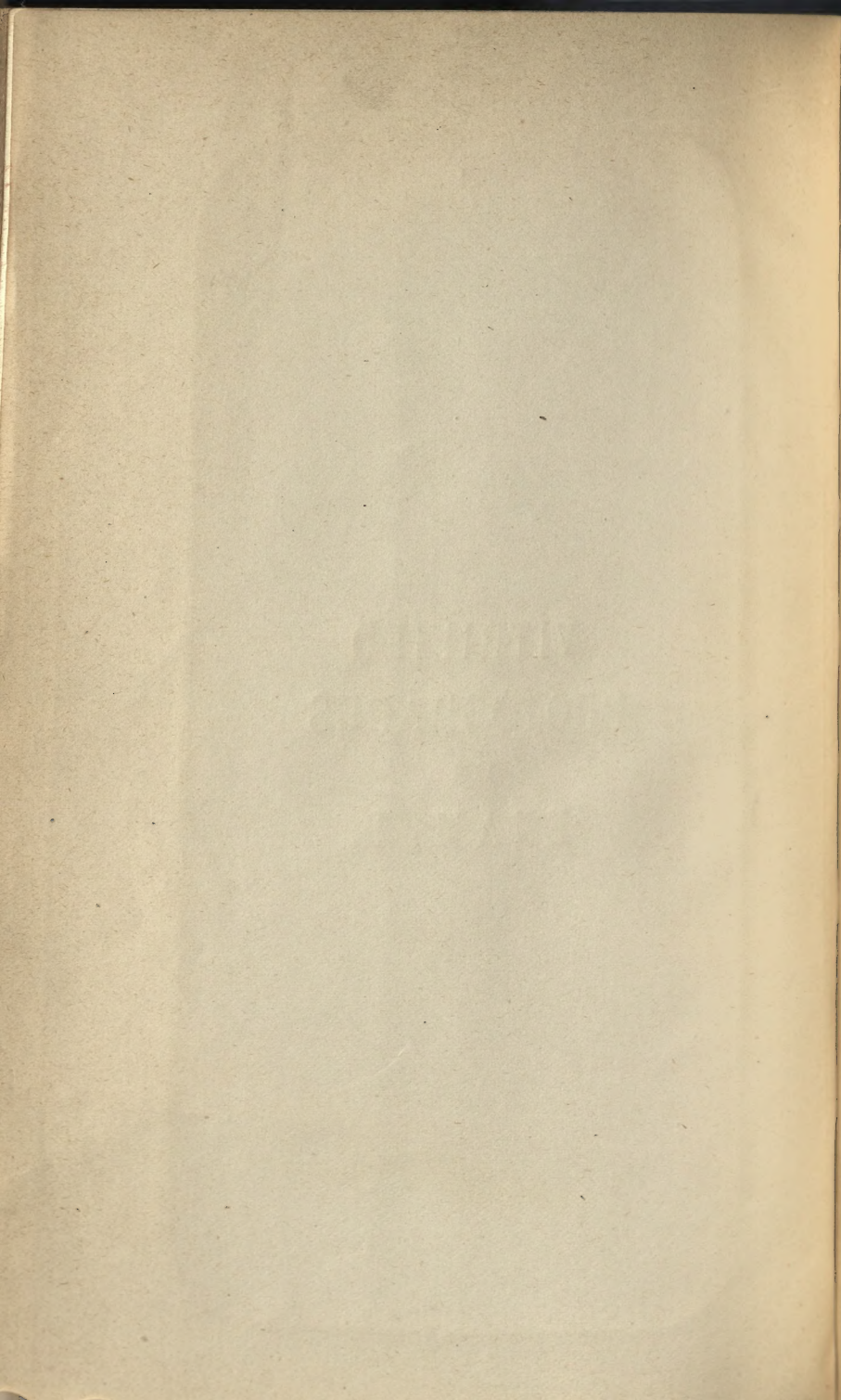


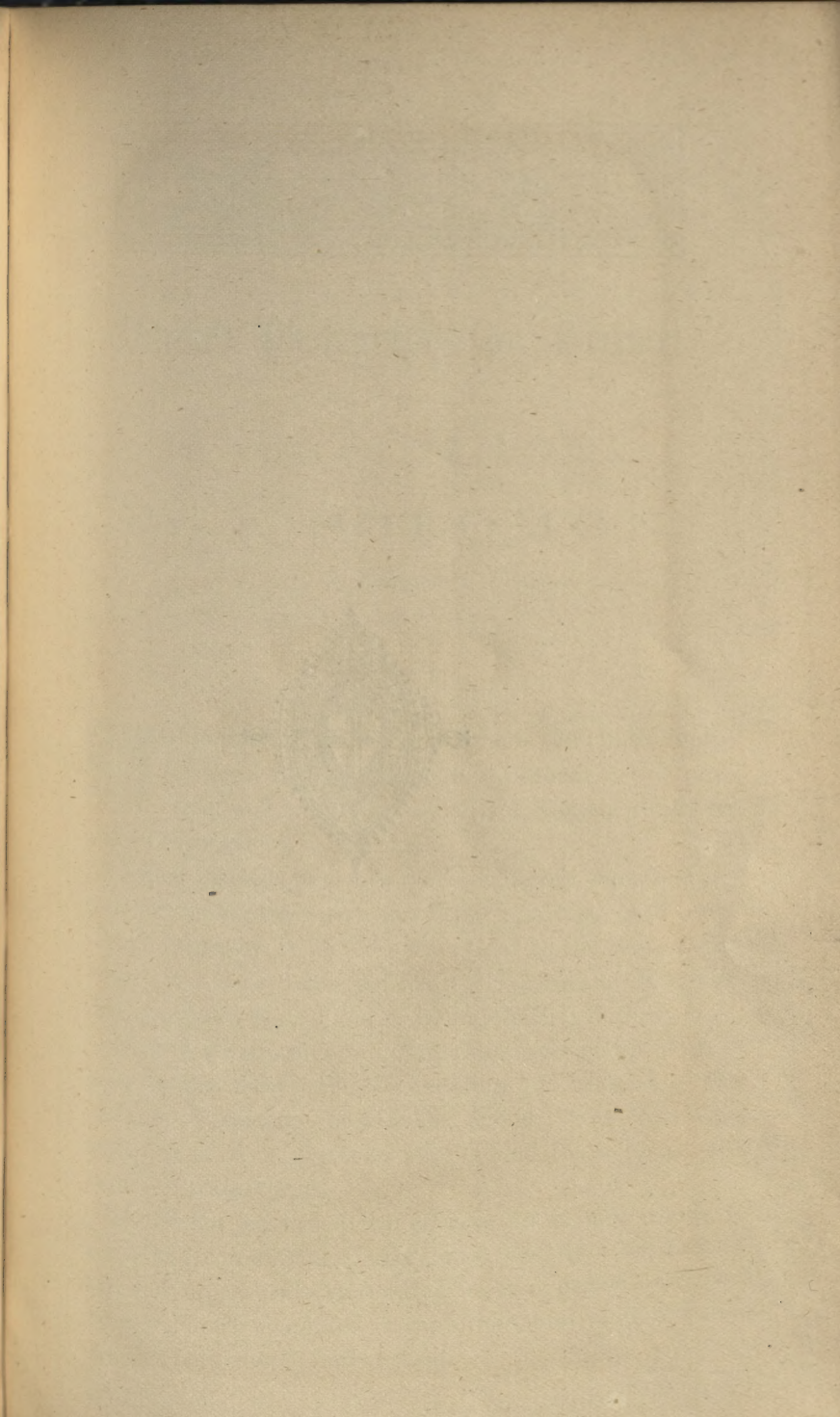
VITRIFIED
PHOTOGRAPHS
ON
ENAMEL.

58/

ENAMLED
ON
VITRIFIED
PHOTOGRAPHS

VERIFIED
RECORDS
OF
THE
CITY OF
NEW YORK









Vitrified Photographs on Enamel.

THE POWDER AND FILM PROCESSES

BY I. SOLOMON.

—o—o—o—
INTRODUCTION.
—o—o—o—

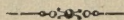
THE author deems it an axiom to all individuals of taste, that for beauty and permanence a portrait well executed in Vitrified Enamel ranks as a *chef-d'œuvre* among works of art.

Vitrified Enamels have always been highly esteemed by their fortunate possessors for these qualities, and now that photography, rendered subservient to the will of the artist, gives as a basis for his work a faithful likeness, their popularity is destined to be indefinitely increased.

Being of all artistic productions the most permanent, it presents the most valuable medium of rendering the portraits of eminent individuals, friends, and relations, *everlasting*, so that posterity may behold them in all the beauty of truthfulness.

The author purchased the secrets he is now about to reveal at a considerable outlay, and has, by a continuous series of experiments, extending over a period reckoned by years, much simplified their details, and rendered their practice both simple and certain.

With these few remarks he passes at once to the practical description of the various processes in Powder and Film, and will make it his endeavour to be so explicit that any one who understands photography may have no difficulty in practising this important branch of the art.



The Transparency.

The successful working of the processes of Photo-Vitrified Enamelling, hereafter described in these pages, depends in a great degree upon the excellence and suitability of the Transparencies, and hence the author thinks it advisable to devote a preliminary chapter to a description of the qualities such should possess, and of formulæ and methods by which they may be produced.

The Transparency which gives the very best result in the Powder process is entirely unsuited for the Film process, and *vice versa*.

For the Powder process one Transparency suffices (like a negative) for the production of any number of proofs of one size, and (again like a negative) it should be fully developed, the high lights being full of detail and well rounded, or the proof therefrom will be flat and devoid of beauty. Such a Transparency is seen to advantage by transmitted light.

In the Film process each enamel requires a separate Transparency, the Collodion Film after treatment, as hereafter taught, being transferred to the enamel tablet. It should appear full of detail, from deep rich blacks to transparent glass, when looked through; the enamel after transfer showing through the film and forming the high

lights. Such a transparency is seen to advantage against a white surface by reflected light.

In the production of the Transparency for the Powder process, the same developer as used in the production of the negative will suffice. But the following will be found more suitable for the production of the transparency for the Film process, viz:—

a. Pyrogallie Acid	...	...	3 grns.
Citric	„	...	3 „
Glacial Acetic „	...	...	15 minims.
Water	...	...	1 oz.
b. Protosulphate of Iron	...	...	10 grns.
Glacial Acetic Acid	...	...	12 minims.
Water	...	...	1 oz.

For developer “a,” the exposure in good light will vary from 2 to 10 minutes. A slow development is necessary, as, if the picture come up rapidly, it will be weak, and will not be improved by after treatment. In the case of a very dense negative, developer “b” will be found more expeditious; but as its action is very rapid, the operator must be prepared to *arrest* it immediately the faintest detail is observed in the face, and he must then cautiously strengthen the picture with developer “a,” plus a drop or two of a solution of nitrate of silver. Fix with cyanide, and wash well.

A Copying Camera of some species becomes a necessity in working the Film process, and for all practical purposes (especially where enamelling is but an occasional and very limited pursuit) the home-spun article will answer as well as that designed and constructed by a skilled mechanic.

Two boxes open at the ends sliding into each other, the one fitting in the front of the ordinary rigid camera, the other taking the back, serve excellently well, and all that

is necessary to complete the outfit is a third box open at one end to receive the camera, and having the other end formed by the negative holder, which should be removable at will, to be substituted by others with different openings, so that the operator may not be confined to negatives of one size only.



No. 1. Powder Process.

It is well to observe at the outset that the following solutions may be made and kept in daylight in their separate state; but when compounded for work they should be thenceforth kept in the dark room.

And that it is better to mix only a sufficiency for the wants of a day or two in summer, or of a week in winter, as the freshly prepared mixture works far more satisfactorily than one that has been kept beyond the limits here indicated.

The sensitive mixture being recommended to be kept in the darkroom, or under the influence of yellow light, it is scarcely necessary to remark that the operations of sensitising, drying, and developing *must* be performed in the dark room likewise.

FORMULA No. 1.

a.	Dextrine ...	...	...	1 oz.
	Grape Sugar ...	...	...	1 oz.
	Finest Powdered Gum Arabic ...	...	...	1 dr.
	Distilled Water ...	...	...	10 oz.
b.	Bichromate Ammonia ...	...	...	1 oz.
	Distilled Water ...	...	...	10 oz.

To form the sensitiser mix equal parts of "a" and "b" and filter.

FORMULA No. 2.

<i>a.</i>	Best Honey	...	...	...	8 grns. wt.
	White Sugar	...	...	...	15 grns. ,,
	Gum Arabic	...	...	...	1 drachm ,,
	Glucose	...	...	...	1 drachm
<i>b.</i>	Bichromate Ammonia	...	...	...	5 oz.
	Distilled Water	...	...	...	$\frac{1}{2}$ oz.

Mix equal parts "*a*" and "*b*," *filter*, keep and use as Formula No. 1.

FORMULA No. 3.

<i>a.</i>	White Sugar	...	...	...	4 drachms.
	Gum Arabic	...	...	...	5 drachms.
	Distilled Water	...	...	...	5 oz.
<i>b.</i>	Bichromate Ammonia	...	...	...	$\frac{1}{2}$ oz.
	Distilled water	...	...	...	5 oz.

Mix equal parts, and filter as for No. 1 Formula.

FORMULA No. 4.

Put 15 oz. of Pulverized Borax into a large bottle, and fill up with Distilled Water. Shake well once, at least, each day for, say, three days; then decant the clear liquid, and refill the the bottle, repeating the operation as required until the Borax is exhausted.

<i>a.</i>	Powdered White Sugar	...	...	...	6 oz.
	Best Powdered Gum Arabic	...	...	...	2 oz.
	Filtered Water	...	...	...	35 oz.

Shake well till dissolved, and then add 17 oz. of clear solution of Borax.

<i>b.</i>	Honey	...	...	...	4 dr.
	Solution Borax	...	...	...	6 oz.
<i>c.</i>	Bichromate Ammonia	...	...	...	1 oz.
	Distilled Water	...	...	...	5 oz.

To form the sensitiser, take:—

Solution "a"...	...	...	2 dr.
Solution "b"...	...	...	1 dr.
Distilled Water	...	...	3 dr.

And, if the weather be *hot*, add 4 drops of "b," shake well, and filter.

Procure two small jugs with lip and handle, or two cylindrical vessels of glass, and into one of them place a funnel with filtering paper, the reason for which will appear hereafter. Also the following:—

- a. Two deep Porcelain Pans.
- b. Levelling Stand.
- c. Thin small sheet of Iron or Steel.
- d. Spirit Lamp.
- e. Blotting Paper.
- f. Vitrified Powder.
- g. Camel Hair Mop.
- h. Printing Frame with Plate Glass.
- i. Some good polished Crown or Patent Plate Glass, as flatness and freedom from scratches are of the highest importance.



Manipulation.

Clean the glass perfectly with diamond polish or other medium, but the former is particularly recommended as giving a chemically clean surface with the minimum of trouble. Now enter the dark room, pour a sufficiency of the sensitiser into one of the jugs or vessels of glass, carefully dust the surface of the cleaned plate, and pour over the liquid as one does collodion. Let it run to all parts, and cause the superfluity to run off at one corner into the funnel placed in the other jug or glass. Hold the

plate diagonally in a slanting position, the corner from which the sensitiser left the plate downward, and then set to drain in the same position on a piece of blotting paper. Now light the spirit lamp, and place it between the legs of the levelling stand, lay on the latter the iron plate, upon it two or three folds of blotting paper, and above all the coated plate (still in a slanting position) and dry by *gentle* heat. When bright and hard, the plate is ready for exposure. Take the pressure frame, place therein, first, the transparency with film upwards, then the sensitive plate film downwards (both films in contact), being careful to avoid friction, as that would mar the result.

The duration of exposure requires some experience to determine, and until the student has acquired this he should be content to risk one plate as an experiment, and as a guide to each day's work.

In bright summer weather it varies in length from 20 to 30 seconds; in dull weather as many minutes; but an exposure of from 1 to 2 minutes to magnesium light, according to the greater or lesser density or clearness of the transparency employed, will generally suffice.

The actinometer used in carbon printing is here of great service.

In cold weather it is not only necessary the plate should be put warm into the pressure frame, but that it should be dried after removal from it previous to development, as the hygrometric influence of the atmosphere is then great; but it must be allowed to cool again before development. It is also of equal importance that the operation of development should be performed in a warm room.

Hold the plate in the left hand, throw over the surface the vitrified powder, and shake the plate so as to scatter it over all parts of the image, or where the image should appear, for sometimes it will be scarcely perceptible when removed from the pressure frame.

Now with the camel-hair mop gather the powder into a heap, and again distribute it over the surface by a gentle rotary motion, then brush it back again to the tin stock box, and stand the plate aside for a few minutes to be influenced by the humidity of the atmosphere. Three or four plates may be thus treated in regular sequence, but more it is not advisable to have in hand at one time. As a perfect result is the object aimed at and such an one is worth all the trouble expended in its production, it is always advisable to print and develop two or three proofs of the same subject, and only to vitrify that which proves the best. Dust the image four times, resting between each operation from two to ten minutes, and when the image is as brilliant and full of detail as the transparency, it is ready for the next operation. The correct time of exposure is a most important item in the process, and must have the nicest attention of the student.

Now take one of the deep dishes, nearly fill it with water, and acidulate weakly with hydrochloric or nitric acid. Coat the plate with plain collodion, and when set, draw the finger-nail round the top and two sides, leaving sufficient margin for over-lap, lower the plate into the dish, to loosen the film and eliminate the bichromate, which, unless removed would cause a greenish-yellow tinge to the finished result. If the image is to be fired the next day, the film must remain in the acid solution until wanted, but in this case, the quantity of acid must be less. However weak it may be, it is important this solution should be acid, otherwise air bubbles will form on the surface, and appear after firing in the shape of white spots, some very minute, others larger, all only too plainly perceptible.

When every trace of the chromic salt has been eliminated, carefully withdraw the plate from the acid bath and place it in a dish of water, where leave it a short

time; then remove and set up to drain on blotting paper while you empty and refill the dish.

Now loosen the attachment of the film to the glass by drawing the finger carefully across the bottom, introduce the glass with the film upon it into the water and the latter will float off easily; remove the glass and reverse the film with a soft brush so that the collodion side may be downward.

Some enamellers place the powdered side downwards on the enamel, but before this is done, the film must float an instant on a strong syrup of white sugar to give it adherence to the enamel.



Transferring the Film to the Enamel.

Wash the tablet in a solution of carbonate of soda to remove all greasiness, lay it on the brass holder, slowly lower it into the water and gently bring it under the floating film. If the brass holder be supported by the left hand, the adjustment of the film upon the tablet may be assisted with a soft brush held in the right. When the pose is correct, lift the tablet from the water, bearing the film upon it. Lay down the brush and carefully lift the tablet from the holder, now put down the holder and with the left hand twist the overlapping film, cut off what is superfluous with a pair of scissors and stand the picture aslant on blotting paper to dry. If the collodion side of the picture be not in contact with the tablet there will be no adherence, and the film will strip off in drying, unless it has been floated on the syrup before mentioned.

A like result follows when the tablet has not been cleansed, even though the collodion side be next to it. If

you desire to have the enamel portrait face the opposite way to the negative make the transparency reversed, and *vice versa*. The operations of washing out the bichromate and posing the film on the tablet require care and dexterity, which latter must be gained by practice.



Fusion or Vitrification of the Picture.

The knowledge of what degree of heat is necessary for the proper fusion of the image can only be acquired by practical experience. The heat must be ardent, and equally distributed over the surface of the muffle, the colour a cherry red. Before placing the tablet in the muffle, stop the draft hole so as to prevent a current of air from that quarter, also close the room, so that there may be no cold currents from the outside. When nearly ready, place inside the muffle one of the cylindrical lumps, and upon it the hollow hemisphere of clay, whereon the disc which carries the tablet in the furnace is turned. Now take one of the largest circular plates of fire-clay, cover it with whitening to form a bed (on which afterwards to place the enamel), and transfer it with the tongs to the hemispherical disc in the muffle, and leave it till well heated. Remove and lay it on a piece of fire-clay while the tablet is placed on its centre. Then return to the muffle and watch carefully the result. The tablet will be seen to heat very rapidly, the collodion film will burn away, and the image will disappear, but as quickly reappear with some parts *brilliant*, indicating fusion. Now turn the disc slowly round, so that all parts may be equally influenced by the heat, and when the picture appears brilliant all over

fusion is complete, and it must be immediately removed to cool. It is important that the enamel be removed at the moment of complete fusion, or the result will be marred.

Until the student has acquired the necessary experience he should remove the tablet once or twice during the operation, and examine it against the light. When the fusion is incomplete, the parts forming the deep shadows will appear dull. The operation is rapidly performed, and when the image is removed from the furnace, the disc supporting it should be placed on a warm brick, so that it may not cool too rapidly. In a few minutes the tablet may be removed by the brass holder to a cold surface, and the operation of burning in further proofs proceeded with. Should the tablet adhere (in spite of the whitening) to the fire-clay a sharp tap on the latter when cool will dislodge it.

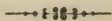
Images on china can be vitrified by the same method, but a solution of boracic acid must be poured over the surface, drained and dried before firing.



Re-touching the Enamel

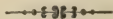
Examine the surface with a magnifier to see if defective. Re-touching the image, and spotting out may be performed in the usual way, using the same vitrifiable powder as that of which the image is composed, ground up with oil of lavender, or fatty essence of turpentine, on a flat slab of glass with a glass muller, until it forms a thin paste, and applied with a fine sable brush. The fatty essence must be evaporated by placing the enamel on a heated plate, and the operation of firing repeated. Every description of vitrifiable powder for developing, re-touching,

and colouring the image is kept in stock at 22, Red Lion Square, so that the artist may have no difficulty in procuring the material for finishing the enamel as highly as may be desired.



Backgrounds.

In every description of portraiture the background has a most important effect, but any one not professedly an artist, may with care and patience, prepare the colours, and apply them so as to form a background in harmonious contrast with the image, repeating the firing to complete the work.



Fluxing the Image.

Fluxing the image is sometimes necessary to give it greater brilliancy or glaze. To do this cover the surface with a thin coating of India rubber solution, drain, dry, and then with a mop brush dust on the flux, and return the enamel to the furnace to fuze.

Boracic acid poured over the surface may be employed as the preliminary coating instead of the india rubber solution. Another method of applying the flux is recommended by Mr. Tunny, of Edinburgh, in the following words:—

“Take as much flux as would lie upon half-a-crown, grind it up in a small mortar in half an ounce of spirits of wine, and add this to half an ounce of ordinary normal collodion; this forms the glazing emulsion. When you have subjected the enamel tablet with its image to a sufficient heat in the mouth of the furnace to destroy the collodion film, lay it aside until cool, then take the bottle containing the enamel emulsion (which must be always

shaken before use), and pour over its surface in the same manner as you would a collodion plate. Have a little bit of blotting paper ready to lead off the last drop in order to avoid the thickening which would otherwise take place, and cause thereby a transparent mark. The surface now presents a perfect coating of enamel glaze; when dry pass it into the furnace, and in a very short time it will become vitrified, giving to the surface a most perfect brilliancy."

FLUXES.

1. Silica	10 parts	...	} Melt in a crucible and when red hot stir well up with a glass rod, pour the contents into cold water and grind to powder.
Red Lead	38 "	...	
Borax	40 "	...	
2. Powdered glass	4 parts	...	}
Nitre	2½ "	...	
Silica	3 "	...	

There are other Formulæ for fluxes, but those here given are as good as any.

VITRIFIABLE BLACK POWDER.

Hard Black China	...	...	...	100 parts.
Brown Purple	...	...	...	40 "
Pulverized and groundup for use.				

Bichromate.

Images on albumenized or gelatinized paper form beautiful pictures and may be produced in the same manner as for an enamel in all operations save heating and firing.

Film Process.

The transparency having been obtained in the manner indicated in the chapter devoted to that subject, draw the finger round the picture to break the film, but leave suffi-

cient margin for overlap, and place the plate in a dish of clean water acidulated with sulphuric acid (sufficiently to taste acid), for the double purpose of loosening the film and toughening it so as to bear without injury subsequent handling. Agitate the water gently, and the film will soon leave the glass, and must then be transferred by means of a soft brush to a fresh dish of water, and after successively to a second, third, and fourth, in order that the acid may be washed out; then transfer to the toning bath made as follows :—

TONING BATH.

Two drachms Stock solution of Platinum.

One pint and a half of Water.

Slightly acidify with Nitric Acid.

The Stock solution is made as under :—

Five drachms Bichloride Platinum.

One hundred ounces Water.

Neutralized with Bicarbonate Soda and acidulated with Nitric Acid.

Leave the film in the toning bath until the colour is changed right through in the deep blacks, and then dip for an instant in

Hyposulphite of Soda 1 oz.

Water 20 oz.

Wash in three changes of water, and then transfer to the enamel tablet.

Instead of the Platinum toning bath, the following may be used. viz :—

STOCK SOLUTIONS.

“a” Cold Saturated Solution of Bichloride of Iridium.

“b” Chlor. Gold, 1 gr. Water, 1 oz.

TONING BATH.

Take of “a” 4 drachms.

” “b” 2 ”

Water 6 oz.

Proceed exactly in the same manner as previously explained, but if instead of a rich black colour, something warmer is desired, immerse the film after toning, fixing, and washing, in the following compound :

STOCK SOLUTIONS.

"a."	Pernitrate Uranium	...	...	30 grains.
	Water	...	...	10 oz.
"b."	Red Prussiate of Potash...	..	30 grains.	
	Water	...	...	10 oz.

BATH.

Take of "a,"	...	...	$\frac{1}{2}$ drachm.
„ "b,"	...	...	$\frac{1}{2}$ „
Chlor. Gold Solution	...	1 minim.	
Water	...	...	10 oz.

The immersion in this bath must be of short duration, or the picture will be enfeebled. Wash once more, and then transfer to the tablet in same manner as described for the powder process; and indeed, conduct all subsequent operations in the same manner. Take particular care not to reverse the film in this process.



LIST OF APPARATUS AND MATERIALS

REQUIRED FOR THE PRACTICE OF

PHOTO-VITRIFIED ENAMELLING.

							£	s.	d.
No. 1 Furnace	...	...	...	...	...	...	2	0	0
No. 2 „	...	...	...	...	...	...	2	10	0
No. 3 „	...	...	...	...	...	...	3	0	0
No. 1 Muffle, closed or open	...	...	...	...	...	...	0	1	6
No. 2 „ „ „	...	...	...	...	...	...	0	2	0
No. 3 „ „ „	...	...	...	...	...	...	0	2	6
Furnaces are supplied complete with 1 closed Muffle									
Clay lumps	...	...	...	...	...	each	0	0	6
Clay caps or hemispheres	...	...	...	...	...	„	0	0	4
Flat clay plates from 2d. to	...	...	...	...	...	„	0	0	6
Enamels, warranted the best Foreign make for Vitrified									
Photographs									
Nos. 1 to 3	...	...	...	...	...	per doz.	0	6	0
No. 4	...	...	...	...	...	„	0	6	6
No. 5	...	...	...	...	...	„	0	7	0
No. 6	...	...	...	...	...	„	0	7	6
No. 7	...	...	...	...	...	„	0	8	0
No. 8	...	...	...	...	...	„	0	9	0
No. 9	...	...	...	...	...	„	0	11	0
No. 10	...	...	...	...	...	„	0	13	0
No. 11	...	...	...	...	...	„	0	16	0
No. 12	...	...	...	...	...	„	1	1	0

						£	s.	d.
No. 13	...	...	...	...	per doz.	1	4	0
No. 14	...	...	...	...	"	1	7	0
No. 15	...	...	...	...	"	1	10	0
No. 16	...	...	...	...	"	1	13	0
No. 17	...	...	...	...	"	1	19	0
No. 18	...	...	...	...	"	2	3	0
No. 19	...	...	...	...	"	2	8	0
Square C. de Visite	...	...	...	...	"	2	2	0

LARGER SIZES MADE TO ORDER.

China Trays 7 × 5 deep	...	...	...	each	0	1	2
Iron tongs	...	...	...	"	0	3	0
Iron Tripod Stand	...	...	...	"	0	2	0
Spirit Lamps from 1s. 6d. to	...	...	...	"	0	5	0
Brass Enamel Support 1s. to	...	...	...	"	0	2	0
Glass Measures, from 9d. upwards							
Cylindrical Glasses	...	...	...	"	0	2	0
Scales and Weights, Glass Pans	...	...	...	"	0	3	6
Funnels from 6d. to	...	...	...	"	0	1	0
Bottles from 2d. to	...	...	...	"	0	1	6
Filtering Paper, each Packet containing 100	...	...	...	"	0	0	10
Blotting Paper	...	...	...	per quire	0	1	0
Patent Plate 4¼-in. × 3¼-in.	...	...	...	per doz.	0	2	0
" 5-in. × 4-in.	...	...	...	"	0	3	0
Pressure Frame, with British Plate Glass 6 × 5 inches				each	0	4	9
Glass Cleaning Board	...	...	...	"	0	1	9
Mop Camel Hair Brush, 1s. 6d. to	...	...	...	"	0	2	0
Dusting Brushes, 6d. to	...	...	...	"	0	1	6
Fine Camel Hair Brush, 6d. to	...	...	...	"	0	1	6
" Sable	"	1s. to	...	"	0	2	6
Stippling Brushes	...	...	...	"
Glass Stirring Rods, 3d. to	...	...	...	"	0	0	9

CHEMICALS.

						£	s.	d.
Diamond Polish	...	...	...	...	per bottle	0	1	0
Ammonia Bichromate	...	...	...	...	per oz.	0	1	0
Borax, pure	...	...	...	...	per lb.	0	1	0
Collodion	...	...	...	...	"	0	6	8
Colours, Vitrifiable	...	...	...	...	per box	0	2	6
„ Moist in Tubes, from 9d. to	...	...	...	...	per tube	0	1	6
Dextrine	...	...	...	...	per lb.	0	0	9
Powders, Vitrifiable, Black or Brown	...	...	...	...	per box	0	2	6
Fluxes	...	...	...	...	"	0	2	6
Essence of Lavender	...	...	...	...	per oz.	0	1	6
Fatt Essence	...	...	...	...	"	0	1	6
Iron Plates, 6 × 5 inches	...	...	...	...	each	0	2	0
Grape Sugar	...	...	...	...	per lb.	0	1	0
Hydrochloric Acid	...	...	...	...	"	0	0	8
Whitening	...	...	...	...	"	0	0	1
Pyrogallic Acid	...	...	...	...	per oz.	0	3	9
Nitrate of Silver	...	...	...	...	"	0	4	0
„ „ re-crystallised, in hermetically								
sealed tubes	...	...	...	...	"	0	4	6
Photosulphate of Iron	...	...	...	...	per lb.	0	4	0
Hyposulphite of Soda	...	...	...	...	"	0	4	0
Oxide of Platinum in Concentrated Solution	...	...	...	...	per oz.	0	2	0
„ Iridium	...	...	...	...	"	0	5	0

The above Articles are kept in Stock at the Warehouse of

I. SOLOMON,

22, RED LION SQUARE, HOLBORN, LONDON.

ORDERS PROMPTLY EXECUTED.

